High flux nano-XRD beamline for Science under extreme conditions

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We will build a new high pressure X-ray diffraction, fluorescence and imaging beamline to take full advantage of the outstanding performance of the EBS. The proposed beamline upgrade will provide significantly higher photon flux density and higher coherence, especially for photon energies above 20 keV, i.e. the energy range most relevant for diffraction and imaging at extreme conditions. This will enable a new class of nano-XRD, XRI and XRF studies under extreme P-T conditions. The direct impact on studies at extreme conditions is that higher pressure and temperature states which can be generated only in smaller volumes will be finely characterized. Transient processes under extreme will be seen. Submicron sample heterogeneities will also become accessible, at the microsecond time scale, with a deeper understanding of processes such as transport (diffusion, viscosity) or crystallization/melting, under extreme conditions. Breakthroughs can be expected in various scientific areas. Here, the main components of the new instrument and expected performance will be presented.